

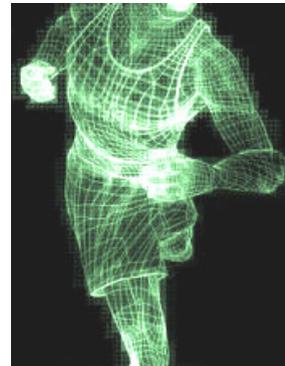
Lab Activity Tasks

Tasks:

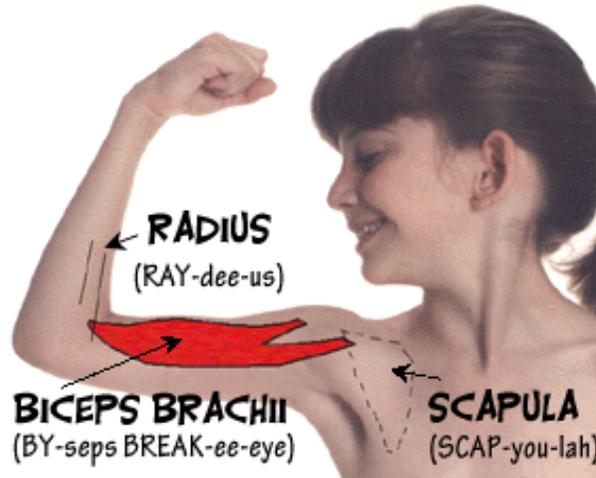
1. Thermoregulation
2. Projectile – jumping
3. Waves – reflections
4. Humidity and fabrics
5. Rebound
6. Reaction timing
7. Tennis simulation

Produced for the Science Learning Centre
Yorkshire and the Humber course:

**YH57 Learning together – the partnership
between science and sport**



Task 1: Thermoregulation



Context:

How does the body control temperature by balancing heat production and loss?

Instructions:

1. Record skin temperature at different distances from the heart; finger and thumb, elbow and neck. Use snapshot mode to produce a bar chart of results. Explain any patterns seen and also the values measured.

2. Tape the sensor over an exposed biceps muscle and record skin temperature continuously whilst picking up the mass and then repeatedly raising and lowering the mass.

Note: steps must be taken to minimise risk to any observers or participants, and the mass must be protected from falling to the floor.

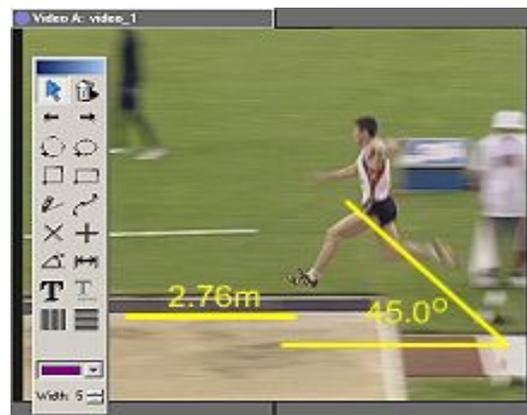
3. Explain the pattern shown by the results, and the implications of this for sportswear.

Equipment: data logger, rapid response temperature sensor, medical tape, large mass (dumbbell)

Task 2: Projectile - jumping

Context:

Many sports work with angles and distances. As long jumpers look to jump further, certain aspects of technique become more important to them. Which aspects of technique can be enhanced by looking at angles of joints at key stages of a standing long jump?



Instructions:

We are going to analyse the various angles at various joints at different stages of the jump.

- Which areas of technique are most important to the distance of the jump?
- Does muscle loading have an effect on the distance jumped?
- Does arm action affect the distance jumped?
- What conclusions can we draw from joint angles at take off and distance travelled?

Equipment: Dartfish software and laptop

Task 3: Waves - reflections

Context:

How does pool design affect speed of swimmers?

This is a practical investigation into the resistance posed by the sides of a container on movement through the container. Lane markers in the pool not only guide the swimmer but damp out the reflected waves.

We will be using a rubber duck but the effect would be the same on a Wilkie or a Spitz



Instructions:

Use the stopwatch to measure several 'swims' of the duck along the pool between two points.

Investigate the use of cord as a lane marker on the time it takes to repeat these 'swims'.

Equipment: swimming pool, rubber duck, string, mass and pulley, stopwatch, lane markers

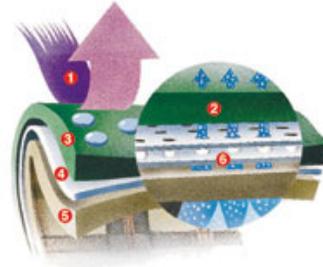
Task 4: Humidity and fabrics

Context:

In recent years there has been considerable development of artificial fabrics.

These have been designed to wick away moisture from the skin and are used in many sports but in particular in outdoor activities.

How effective are they?



Instructions:

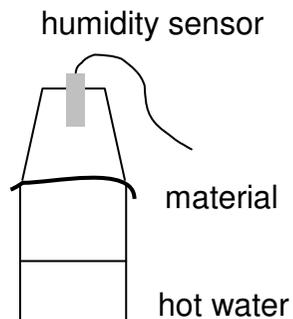
In this experiment the amount of water vapour passing through a number of different fabrics will be investigated using a humidity sensor.

This will need some consideration of how to make it a fair test and also what data needs to be collected to form a firm conclusion..

1. Which of these do you think will give the fastest times?
2. Which of these will give the slowest time?
3. For each of these, discuss with your group why this might be the case?
4. What do you think are the most important considerations when designing footwear for different sports?



Equipment:



humidity sensor,
water bath, 500ml
beaker, range of
fabrics, humidity
sampling cup

Task 5: Rebound

Context:

What are the effects of different surfaces on rebound?

Video analysis is often used to investigate such effects



Instructions:

Science data logging software can be used to measure acceleration and motion with very inexpensive equipment.

In this investigation we will compare the bounce of a ball on different surfaces.

Equipment: table tennis ball, Web cam, Visilog software, plus wood, steel and foam surfaces.



Task 6: Reaction timing

Context:

Speed of reactions are very important in sport as in everyday life.

In this investigation two methods of comparing reaction speed are compared. One uses a software tool available from the internet, the other uses the traditional science approach of catching a falling object – but makes use of software for data analysis.

Which is best?



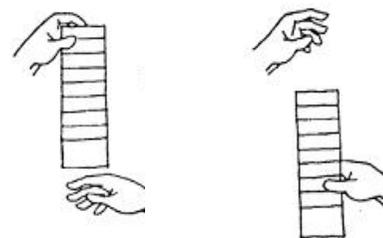
Instructions:

Software: Go to the web pages below and follow their instructions:

<http://getyourwebsitehere.com/jswb/rttest01.html>

<http://www.exploratorium.edu/baseball/reactiontime.html>

Practical : 1. Get a partner to hold the timer card/ruler by the top vertically just above our hand with your finger and thumb slightly open. 2. When your partner releases it close your finger and thumb and try catch it as quick and low down as possible without dropping your hand.



Equipment: internet software – baseball reaction speed, ruler and spreadsheet template

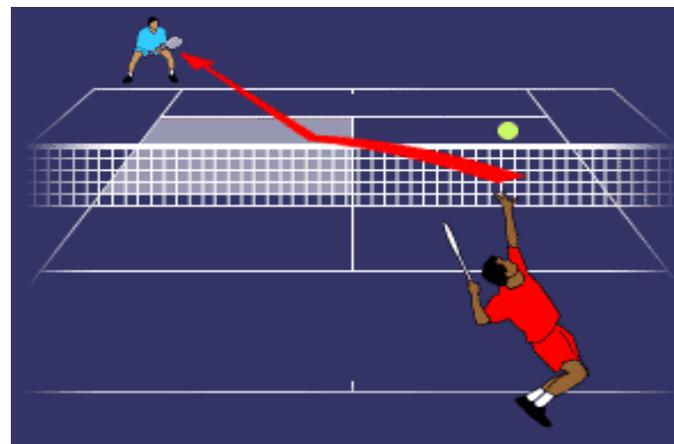
Task 7: Tennis Simulation

Context:

This software allows the user to alter variables to get the ball to land in the service court.

How would this simulation be used in science lessons, if at all?

How would the simulation be used in PE lessons, if at all?



Instructions:

Follow the instructions in the software.

The simulation is available from the Science Enhancement Project (SEP)

Equipment: tennis software, computer